NIILM University Shodh Manjusha: An International Multidisciplinary Journal

ISSN: 3049-2785 Vol.03, Issue 01, Jan- Jun 2026

Benefits and Drawbacks of AI in Education: A Conceptual Note

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CITATION

Meenakshi & Sharma, B. (2026). Benefits and Drawbacks of AI in Education: A Conceptual Note *Shodh Manjusha: An International Multidisciplinary Journal*, *03*(01), 28–36. https://doi.org/10.70388/sm250186

Article Info

Received: Oct 21, 2025

Accepted: Nov 23, 2026

Published: Jan 05, 2026

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https://doi.org/10.70388/sm250186

ABSTRACT

Artificial Intelligence (AI) results in the shifting the way of thinking and doing things by human beings. Many sectors directly or indirectly have been influenced by the use of AI. Under this study, an attempt is made to know about the benefits and drawbacks of AI in education. This study is descriptive in nature and it was found that integrating AI in education promotes personalized learning, automates grading and attendance, facilitates efficiency in administration and improves accessibility. But its use also leads to privacy and ethical concerns, access barriers, loss of human interaction and over-dependence. However, various initiatives have been taken by the government to implement AI in education. But still, there is a need to ensure the effective use of AI technologies in education while safeguarding the privacy of students. There should be a balanced and human-centred approach to integrating AI in education.

Keywords: Education, Artificial Intelligence, Chatbots, Students, and Learning.

Introduction

The term Artificial Intelligence (AI) is coined by John McCarthy, a phenomenal professor from Stanford. Artificial Intelligence has been described as “the science of making intelligent machines” (Kumar, *et al*., 2025). All aspects of human life are seized by AI (Moloi, &

Marwala, 2020). It is being used in various industries including health care, retail industry, manufacturing, life sciences, *etc*. (Valavanidis, A., 2023). In Health care, AI is being used for making personalized treatment plans, analyzing medical images for disease diagnosis with high accuracy, automating tasks by AI driven robotics, *etc.* (Olawade, *et. al.* (2024).

Even, it is being used by the finance industry for risk assessment, fraud detection, algorithmic trading, customer service, investment advisory, credit scoring, financial forecasting and regulatory compliance. Also, with the incorporation of AI, there are some aspects like decision making, customer experience, new business models and operational efficiency are undeniably changing. But some areas such as data privacy and security, upskill employees and ethical dilemma are the most concerning with the use of AI in the finance industry. But, if all these challenges are tackled in an appropriate way, then financial institutions can lead to innovation, efficiency and customer happiness (https://www.forbes.com). In e-commerce, it has various uses like providing quick customer support, resolving queries, analyzing customer behavior and preferences. When we talk about Artificial intelligence in education, it involves integrating intelligent systems into learning environments to enhance teaching methods, streamline administrative tasks and improve student experience. With the advent of more sophisticated AI technologies in the 21st century, the scope of AI has expanded significantly in the field of education.

In India, AI is being adopted by several academic institutions such as the Department of AI at IIT Hyderabad, Centre for Excellence in AI (CAI) in IIT Kharagpur, AI Group (AI@IISc) at IISC Bangalore, *etc*. “AI for All” has been launched by the Ministry of Education (MOE), Govt. of India in cooperation with the Intel and CBSE during August, 2021. It (AI for All) is a self-learning online program and aims to create awareness about AI. (Majid & Lakshmi, 2022). Additionally, AI has been introduced as a subject by the Central Board of Secondary Education (CBSE) in their affiliated schools, in class IX and XI from session 2019-20 & 2020-21, *respectively*. Also, offering AI as an elective in B.Tech course and start offering B.Tech course in AI & data science has been suggested to All India Council for Technical Education (AICTE) approved institutes. Various AI related courses such as Foundation of Artificial Intelligence and Machine Learning, Reinforcement Learning, Deep Learning Foundations & Applications, Probabilistic Reasoning in Artificial Intelligence, *etc*. offered by most of the IITs. Many IITs also provide courses related to AI. Not only this, various short-

term programmes are also being organized by them on Artificial Intelligence for the working professional and interested students (*https://www.pib.gov.in*).

Literature Review

Borenstein and Howard (2020) addressed various emerging ethical challenges of AI. They told about the significance of providing training to future members of the AI community and stakeholders as well. Ahmad, *et al.* (2023) examined the impact of AI on decision making and laziness with the help of primary data, which is collected from 285 University students of China and Pakistan. It was revealed that AI makes lazy to humans and impact their security and privacy. Apart from this, the loss of human decision-making is also significantly impacted by AI. Johnson, A. (2023) emphasized on concerns regarding the use of ChatGPT in schools. Apart from it, the perspective of experts regarding the advantages of ChatGPT was also described. Duy, *et al*. (2024) investigated the factors which are responsible for influencing students' use of AI in learning. Total 390 students participated in the survey and the most significant factors were found perceived ease of use and usefulness influencing students' intention for the use of AI in learning. Stohr, *et al.* (2024) found positive attitudes towards the use of Chatbots in education among more than half of the students but concern about future use was also widespread. Additionally, higher usage was found among male students. Also, engineering students were found most positive and engaged with chatbots. Thomson, *et al.* (2024) examined familiarity of students with AI tools and their opinions regarding its current uses and understanding for AI policies of university. For this, they surveyed 453 students across two institutions in the UK. The results revealed that students had a strong desire to learn more about AI technologies. Additionally, most students were found unfamiliar with published AI policies of their university. Apart from this, most of the students emphasized the significance of understanding about the functioning of AI tools. Arvinth & Geeta (2024) examined the effects of AI on higher education, for which data was collected by conducting an online survey. Nearly two-thirds of respondents were found familiar with AI, and more than half of those polled have no objections towards AI integration into their academic training. Additionally, the majority of respondents revealed improvement in their grades due to use of AI.

Research Objectives: Research Objectives of this study are as follows-

1. To describe the benefits of AI in the education field.

2. To describe the drawbacks of AI in the education field.

Research Methodology

This study is completely based on secondary data which is gathered from various research papers and websites, internet, *etc.* It is a descriptive study which describes the pros and cons of application of AI in the education field.

Benefits of AI in Education

1. **Personalized Learning**- With the help of AI, content can be provided as per the individuals' needs and their skill level. Also, they are recommended courses on the basis of their interests. Students' strengths, their weaknesses and their pace of learning can be analyzed with the help of AI powered platforms to tailor lessons accordingly, which result in more effective and efficient learning experiences.

2. Improved Accessibility- Learners having barriers of visual or auditory, can use tools like text-to-speech or speech-to-text or who have language barriers can use AI translation tools which results in enhanced accessibility.

3. Automated Administrative Tasks- AI resulted in automation of administrative tasks due to which teachers as well as administrators can now focus on their core activities. AI tools can automate tasks such as grading, and student's assessment and it can also extend to student's management such as attendance tracking and monitoring engagement levels.

4. Provide 24/7 access- AI provides 24/7 access to learning. Students can receive help anytime and anywhere with the help of chatbots or virtual assistants. AI tools help the students by answering their questions and providing explanations without any time constraint or availability of teachers.

5. Overcoming Geographical Barriers- AI can make top-notch educational resources accessible to learners in the areas where resources might be limited such as rural or remote areas.

6. Support to educators- Educators can take the help of AI tools for the lesson plans' preparation which can also be differentiated to suit the needs of students.

7. Improved student engagement- With the use of AI-driven educational games and simulations, learning can be more engaging for the students, which might increase their motivation and participation as well.

8. Immediate Feedback- Immediate results and feedback can be delivered with the use of AI-based evaluation tools, which makes it possible to monitor progress in real-time. Thus, AI can speed up the learning cycle. Also, it boosts academic productivity.

Drawbacks of AI in Education

1. Digital Divide- In rural areas, use of AI tools is limited because of lack of adequate infrastructure. Students from low-income families can't take full advantage of AI in education due to limited access to necessary technology such as computers or high-speed internet, which also leads to increase in existing inequalities.

2. Need of training for teachers- There is a need of training for the educators so that they can integrate AI tools into their teaching practices in an effective way.

3. Data privacy and security issue- Another big concern is about data security and privacy (*https://nationalskillsnetwork.in/*). As, AI systems collect and analyze large amount of data on student behavior, their academic performance and emotional states as well and there is a risk of misuse of data by third parties.

4. Risk of misinformation- There might be another risk that is risk of misinformation. Students can be misleading with the inaccuracies in educational content (*https://indiaai.gov.in/*). It is very difficult to ensure the quality of AI-generated content.

5. Risk of Job displacement- Also, there might be a risk of displacement of jobs including administrative jobs such as clerks and some teaching activities.

6. Over dependent on technology- Another risk might be being over dependent on technology, due to which development of critical thinking and problem-solving skills might diminish among the students.

7. Loss of human interaction- Also, with the use of AI, risk of loss of human interaction might occur, which is very essential for emotional and social development. Also, it might impact their overall educational experience.

8. Huge cost- Low-resource institutes face difficulties in implementing AI as it involves huge costs including software subscriptions, hardware upgrades, training of staff, high-speed internet, and ongoing maintenance.

Implications of the Study

This study highlights both opportunities and concerns regarding the application of AI in education. This study is beneficial for educational institutes, policymakers, learners and researchers as well. AI integration should be balanced with human-centered teaching approaches so that essential interpersonal as well as emotional learning aspects can be preserved.

Limitation of the Study

This study is completely based on secondary data.

Recommendations

Guidelines and regulations must be established to protect students from the potential misuse of AI. Strict data privacy measures should be implemented. Adequate training should be provided to educators so that they can effectively use AI tools and integrate them into their teaching practices. Along with this, equal access initiatives and blended learning approaches should be ensured by the institutes for the successful and responsible implementation of AI in education.

Conclusion

Thus, it can be concluded that use of AI has both its advantages as well as drawbacks in the education field. On one side, integration of AI in education offers various benefits such as personalized learning experiences, automated administrative tasks, providing immediate feedback, supporting students with diverse learning needs, enhanced students' engagement, providing 24/7 support, *etc*. But, on the other side, implementation of AI in education faces

several challenges such as digital divide, data privacy concerns, lack of teacher training, over dependent on technology and loss of human interaction. We should keep in mind that education is not only about academic success. Students' emotional development as well as social development is also equally important and AI cannot replace the mentorship and emotional intelligence that human teachers provide. Educational institutes must adopt AI responsibly. By strategically balancing the benefits and drawbacks of AI in education, institutes can harness its benefits while mitigating its drawbacks.

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